THE
ROBERT A. WELCH FOUNDATION RESEARCH BULLETIN

A CRITICAL APPRAISAL OF GOVERNMENT RESEARCH POLICY

By

Dr. Philip Hauge Abelson

Bulletin No. 14 November, 1963

Houston, Texas

The material contained herein does not necessarily reflect opinions of The Robert A. Welch Foundation.

PRINTED IN U.S.A.

THE
ROBERT A. WELCH
FOUNDATION
RESEARCH BULLETIN

W. O. Milligan, *Editor*

Bulletin No. 14 November, 1963

Houston, Texas

THE
ROBERT A. WELCH
FOUNDATION

THE TRUSTEES

Daniel R. Bullard
President, The Robert A. Welch Foundation, Houston, Texas

Wilfred T. Doherty
Vice President, The Robert A. Welch Foundation, Houston, Texas

Lester Settegast
Trustee, The Robert A. Welch Foundation, Houston, Texas

Roger J. Wolfe
President, Wolfe Oil & Gas Co., Houston, Texas

DIRECTOR OF RESEARCH

W. O. Milligan, *Vice Chancellor for Research*, Texas Christian University, Fort Worth, Texas

SCIENTIFIC ADVISORY BOARD

Roger Adams, *Professor of Chemistry and Retired Head of Department*, University of Illinois, Urbana, Illinois, 1956—

Arthur C. Cope, *Professor of Chemistry and Head of Department*, Massachusetts Institute of Technology, Cambridge, Mass., 1960—

P. J. W. Debye, *Professor of Chemistry and Retired Head of Department*, Cornell University, Ithaca, N. Y., 1954—

Henry Eyring, *Dean of the Graduate School*, University of Utah, Salt Lake City, Utah, 1954—

C. Glen King, *Associate Director*, Institute of Nutrition Sciences, Columbia University, New York, New York, 1954—

Glenn T. Seaborg, *Chairman*, U. S. Atomic Energy Commission, Washington, D. C., 1957—

FOUNDATION OFFICES

2010 Bank of the Southwest Building, Houston, Texas 77002

THE ROBERT A. WELCH FOUNDATION

"A CRITICAL APPRAISAL OF GOVERNMENT RESEARCH POLICY"

By

Dr. Philip Hauge Abelson
Geophysical Laboratory, Carnegie Institution of Washington
and
Science, American Association for the Advancement of Science
Washington, D. C.

An after dinner address delivered before "The Robert A. Welch Foundation Conferences on Chemical Research. VII. Modern Developments in Analytical Chemistry," November 19, 1963, Houston, Texas.

A CRITICAL APPRAISAL OF GOVERNMENT RESEARCH POLICY

Five months ago, Dr. Milligan, Director of Research of the Welch Foundation, reached me by transatlantic telephone in Paris. He invited me to speak here this evening, and he urgently wished to have the title of my projected talk. Without much reflection I gave him the title which has just been announced — A Critical Appraisal of Government Research Policy. That was a mistake, as I learned when I began to prepare for this occasion, for in reality there is not really such a thing as government research policy. There are pieces of policy, in the form of instructions covering procedural matters, for instance, but there is no policy in the major sense of a coherent, logical body of principles clearly stated and openly followed.

Rather, government research policy is manifested on a piecemeal basis as the summation of a large number of decisions. Thus, it becomes important to determine who makes the decisions. Indeed, an effort to look at government research policy is potentially meaningful only if one inquires into the identity and mode of operation of the policy-makers, instead of seeking to delineate the policies themselves. By any criterion the President's Science Adviser, Dr. Jerome Wiesner, has been the major factor in decisions affecting monetary support of and organization of science. He and his associates have been in a position to dominate government decisions with respect to science. Accordingly, I will begin by discussing his source of power, then tell what can be said about his associates and his staff, and ultimately mention some of the means by which control is exercised.

Dr. Wiesner has accumulated and exercised more visible and invisible power than any scientist in the peace-time history of this country. His authority stems from many sources. He is the President's personal science adviser, the Chairman of the President's Science Advisory Committee, the Director of the Office of Science and Technology, and the Chairman of the Federal Council on Science and Technology. The President's Science Adviser has had considerably more access to Mr. Kennedy than has any other scientist. In the *New York Times* Magazine Section, Mr. Finney has said:

> "There is also a close, informal relationship between the President and the young engineer who was one of the campaign confidantes and advisers. Hardly a day passes that Wiesner does not talk to the President, either in person or by telephone."

Another major element in the structure that accounts for Wiesner's power is the Office of Science and Technology. The formal objectives of the creation of this organization can best be described by quoting directly from the President's message to Congress of March 29, 1962.

> ". . . it is contemplated that the Director will assist the President in discharging the responsibility of the President for the proper coordination of Federal science and technology functions. More particularly, it is expected that he will advise and assist the President as the President may request with respect to:
>
> > (1) Major policies, plans and programs of science and technology of the various agencies of the Federal Government, giving appropriate emphasis to the relationship of science and technology to national security and foreign policy, and measures for furthering science and technology in the Nation.
> >
> > (2) Assessment of selected scientific and technical developments and programs in relation to their impact on national policies.
> >
> > (3) Review, integration, and coordination of major Federal activities in science and technology, giving due consideration to the effects of such activities on non-Federal resources and institutions.
> >
> > (4) Assuring that good and close relations exist with the Nation's scientific and engineering communities so as to further in every appropriate way their participation in

> strengthening science and technology in the United States and the Free World.
>
> (5) Such other matters consonant with law as may be assigned by the President to the Office."

Another authorization for the exercise of power is provided by the Federal Council for Science and Technology, of which Wiesner is Chairman. Among its functions the Council is specifically charged to:

a. provide more effective planning and administration of Federal scientific and technological problems;

b. identify research needs including areas of research requiring additional emphasis;

c. achieve more effective utilization of scientific resources and facilities of Federal Agencies including the elimination of unnecessary duplication; and

d. further international cooperation in science and technology.

These charters provide a justification for the exercise of power in virtually all governmental research fields.

To implement an effort to coordinate research, Dr. Wiesner has been given major additional power. He participates in decisions on budgetary matters. In effect, he is director of the Bureau of the Budget where scientific matters are concerned. One could make such a statement on the basis of talking to government people in Washington. However, the matter has been described with relative clarity in an address by William D. Carey, Executive Assistant Director of the Bureau of the Budget. His statement was printed in the *Congressional Record* of September 30, 1963, from which the following is quoted:

> "The Bureau of the Budget has never agreed with suggestions that it should establish within its structure a Division of Science, staffed with qualified scientists and engineers, to review R. and D. proposals. To be sure, our analysis frequently requires input

> of sophisticated professional judgment as to technical feasibility, state of the art, and possible alternatives to a proposed line of development, as for example in the moon program or in the missile field. In recent years, however, we have been able to obtain this kind of judgment through the Office of Science and Technology and the President's Science Advisory Committee. This year, for example, we selected the areas of atmospheric science, oceanography, water research, high energy nuclear physics, basic science, and science information for special review, and we conducted this exercise jointly with the office of the President's Science Adviser."

It is clear from this quotation that the Bureau of the Budget is inclined to heed the Science Adviser's counsel on scientific matters. However, should some question arise as to his rightful preeminence, he has at his disposal a battery of leading scientists who could outgun any group which the Bureau of the Budget might assemble. It would appear that in this arena he would rarely fail to have his way in budgetary matters. I need not dwell on the real power that monetary control gives. Even the most powerful agency head must make his peace with the Science Adviser lest his budget suffer. I know of no evidence that this budgetary power has been misused, but its very existence cannot but color relations between the Adviser and various agencies of the government.

Another unofficial source of power is activity in the procurement of top-level scientific personnel. When an important post becomes vacant, the Science Adviser, among others, is consulted in filling it. In view of the various positions he formally occupies he has a considerable voice in the making of such appointments.

In the course of his activities the Science Adviser is called on to make an enormous number of decisions concerning a wide variety of problems. Insofar as is humanly possible he rises to the challenge and is one of the most conscientious, hard-working men in Washington. However, no man unaided could handle well all the problems that come to his manifold offices.

To help him the President's Science Adviser has the benefit of two principal advisory mechanisms and, in addition, an operating staff. The most prestigious of these is the President's Science Advisory Committee, of which he is Chairman. This consists of 18 distinguished scientists who customarily meet for two days out of each month. In these meetings a host of agenda items are covered. In situations such as this a full-time chairman dominates the proceedings as much as he wishes. He can select the items that appear on the agenda. He can choose the information to be presented to the committee, and even the individuals who will make the necessary briefings. With committees of this type it is only necessary for the Chairman to be able to count on the active support of four or five of the 18 to assure effective control. Members of the Committee serve for three years and are appointed by the President, who, in making appointments, naturally consults the man who is both his Science Adviser and the Chairman of the committee. Even a man with moderate talents could control such a situation, and the Adviser has a full share of capabilities.

Dr. Wiesner has at his disposal, if he wishes to use it, essentially the total scientific capability of this country, for almost everyone will respond to a request from the executive offices of the President. Of the nation's nearly three million scientists and engineers, approximately 300 have served, some of these on many problems. The usual method involves ad hoc panels. As an example of how a panel might work, consider the following hypothetical questions concerning NASA's policy with respect to scientific exploration of the moon. Should all unmanned vehicles concentrate on obtaining information relevant to the Apollo program? Should scientific experiments be conducted which apparently have no direct relevance? To answer such hypothetical questions, a panel of scientists would be convened. The Executive Secretary of the group would be the man who is in charge of the space desk in the Office of Science and Technology.

One or more of the panelists would be members of the President's Science Advisory Committee. Others would be distinguished scientists who had participated actively in the space program.

There are those who might inquire as to the justification for the President's Science Adviser's participating in a policy matter so central to the activities of NASA. The answer is of course that lunar exploration requires money and, in turn, decisions by the Bureau of the Budget.

Scores of questions in many fields of government activity are considered by such panels. In principle, it is possible to utilize the best brains of this country in this way. No official list has been released which permits complete identification of panelists, and Dr. Wiesner's office has stubbornly refused to divulge their identity. However, the general composition of the panels is known, in part through the work of Meg Greenfield of the *Reporter* magazine, who spent a year studying the operations of Dr. Wiesner's office. She states that "about half the mystery guests come from private industry." A substantial number of the remaining half, the academic representatives, are either at present in the Cambridge area or in the past have had some connection with it, such as service in the M.I.T. Radiation Laboratory during World War II.

Actually, the panel system has serious potential weaknesses. Brilliant men come to Washington for a few days, are given detailed briefings, and then, with a limited amount of time for consideration, make decisions which may involve tremendous sums of money and even the security of the nation. Their eventual decisions can be manipulated by controlling the nature of the briefings. Their report, when issued, is in general not a public document. Thus, if it is not convenient to implement the conclusions, the report can be pigeon-holed.

For the most part it is probably not necessary to engage in such tactics, since the panelists apparently are rather carefully selected. Advisory groups such as PSAC and the panels can be a valuable source of ideas and information. Such groups, however, cannot usefully make operating decisions, nor can they implement them. Since the role of the panelists is advisory in nature, and since they are stationed elsewhere, they cannot be held fully responsible. They have considerable influence while at the seat of power, but once away from it, their influence is diminishingly small.

With all his duties the Science Adviser can personally attend to only a tiny fraction of the problems and developments. While he can get much good counsel from advisory bodies, he must depend heavily on a group of full-time associates. One of these is his deputy in OST, Colin MacLeod, a biologist who has just recently been appointed. Dr. MacLeod is a very valuable addition and he will doubtless be helpful, but his influence is not yet apparent. The principal source of assistance is a staff of professional aides totaling 16.

To present an official version of what this group does, let me quote from a statement by Wiesner made October 16, 1963, at a hearing of a subcommittee of the House Committee on Science and Astronautics:

> "The Office of Science and Technology, since its establishment last year, has developed into a staff mechanism to serve the Special Assistant, the PSAC and the Federal Council. Slightly more than a dozen highly-trained specialists in science, engineering, and administration provide assistance to these activities by identifying issues, phrasing questions, gathering information from the agencies on problems in scientific fields, working closely with the Bureau of the Budget, the Council of Economic Advisers, and other Executive Office agencies, and following up the implementation of Federal programs. In addition, the Office has served as the channel by which the Executive Branch meets its duties to the Congress on matters of over-all science policy."

From this quotation it is evident that the OST staff has large responsibilities and authority; this is indicated, for instance, in the phrase, "following up the implementation of Federal programs." One would expect that this staff should be of highest professional caliber. I was, therefore, interested in checking up on the qualifications of this group of so-called "highly trained specialists." While a few are quite competent, they do not in sum constitute a distinguished group of scientists. A search of *Chemical Abstracts* and *Science Abstracts* reveals that during the past 10 years none of these 16 men has written for any of the publications abstracted by these mechanisms. I have also noted their biographies in *American Men of Science.* Only 9 of the 16 are listed. Omission of some of these is understandable on the basis that they were not even trained in science.

Nevertheless, this group of 16 collectively exercise perhaps almost as much power as Dr. Wiesner himself. Some of the mechanisms by which power is exerted have proved distressing to government agency heads. The director of a great national establishment may receive a telephone call. The voice at the other end says, "This is Dr. Wiesner's office calling." The director is faced with a dilemma — what does this call represent? Is Dr. Wiesner's office calling to pass on an order from the President, the President's Science Adviser, the Chairman of the President's Science Advisory Committee, the Director of the Office of Science and Technology, or the de facto Chief of the Bureau of the Budget, or is the staff member from OST who is making the call simply throwing his weight around? Very often the latter is the case, but the agency head is not well-advised to question too closely. The call may be a request for charts and information to be used in a briefing the next day. The director has no alternative but to turn his agency upside down to meet the deadline. If the President or Dr. Wiesner were personally interested in the material and he failed to deliver, he might find himself in a very embarrassing position.

In preparing for this talk I was in touch directly and indirectly with a number of major agencies in Washington. All have had numerous calls from staff members in Dr. Wiesner's office. Unfortunately, it is not always the agency head to whom the request is directed. I am told that members of the staff of OST have seen fit to contact subordinates within agencies, sometimes without the knowledge of the responsible head. This kind of procedure wreaks havoc with morale, for when it occurs, the underlings naturally assume that their chief is on the skids.

Recently I talked with a man who is relatively high up in the Space Administration and elicited from him the information that the man who has the space desk at OST is in frequent communication with various subordinates in the Space Administration and that he often concerns himself with technical matters. NASA has attempted to obtain the advice of the scientific community and for this purpose has a number of advisory groups whose membership includes Nobel Prize winners, many members of the National Academy of Sciences, and most of the leading contributors to space research, such as Professor James A. Van Allen. The total membership of these advisory subcommittees is about 70. In an effort to assess the weight their advice carries, I asked the official the following question, "Would you say that an underling in OST has more weight in technical decisions affecting the Space Agency than that possessed collectively by all your consultants?" The reply was, "Yes, he does." The man in question is a conscientious person, and I would not wish to seem to disparage his character or accomplishments. The fact is, however, that he has not demonstrated unusual proficiency in the area in which he wields so much authority.

According to the original plan, such staff members were to act as subordinates, making arrangements for panels and acting as go-betweens in the transmission of information from Dr. Wiesner and the PSAC to the agencies. In practice, however, PSAC and the panelists are on hand only a small part of the time. Dr. Wiesner is engaged in hundreds of activities. Someone must make interim decisions, and this naturally falls to the staff of OST. Thus, in reality, though it wasn't planned that way, a major fraction of government research policy is made and executed by a small group of men having little proven competence in science.

I have pointed out the enormous power possessed by Dr. Wiesner and have sketched some of the activities of PSAC, his OST staff, and the 300 panelists who have been called in. Numerically the total base for advice represents on the order of 0.01% of the nation's scientific and engineering brains. Are these our best brains? We have no way of knowing, for the identity of their owners is kept secret. Are they used effectively, or are the advice and ideas of these men circumvented? We do not know. Could the ideas involved be sharpened by suggestions and knowledge possessed by the 99.99% who are not consulted? Again, we do not know, because it has not been tried.

In the present situation the Science Adviser and his associates have authority and responsibility to advise, to plan, and to make operating decisions. They are in effect judge, jury, and prosecuting attorneys in a court conducted in secrecy. Historically, concentration of power under such circumstances has led to flagrant abuses and widespread corruption. In the present instance, thus far there are only indications of abuse of power. Perhaps this might not be an excessive price to pay if one could be sure that the office was functioning effectively. There is little evidence that the activities are producing a notable constructive residue.

Only a few documents are available from Dr. Wiesner's office, and these are not impressive. The annual report for 1962 of the Federal Council for Science and Technology basically merely lists studies which are under way. There is little mention of results. His testimony before Congressional Committees describes problems and makes recommendations but rarely, if ever, outlines accomplishments.

An important part of his responsibilities is his role as the President's Science Adviser. This activity is, of course, cloaked in secrecy, and appropriately so. Our only basis for judging the effectiveness of his advice is presidential action taken with respect to science and technology. Members of this audience can make their own judgments in this area. My opinion is that Mr. Kennedy has been more vigorous and has seemed more surefooted in almost every other sphere than in science.

The present mechanisms for policy-making with respect to science and technology are badly in need of overhaul. Too much power is concentrated in a few overworked people. most of whom are of limited competence. The secrecy of the operations and the power invoked must inevitably lead to corruption. either of the intellect or of the purse. Except in dire emergency there is no excuse for creation of a czar of science. With the easing of cold war tension. the desirability of having such a man has vanished.

This audience includes many scientists who are supported by government research contracts or grants. They will be interested in a few comments on how government policies affect them. These policies lead to serious inequities in the distribution of research money. There is. for instance, the concentration of a large fraction of the support in a few universities. Actually, in fiscal 1962, 10 universities received 39% of the total funds. Simultaneously. the smaller colleges now find it difficult to retain key personnel and are ceasing to be good sources of graduate students in science.

The President's Science Adviser has not done a great deal either to enhance or to lessen these problems. His principal effort was an attempt to influence the fiscal 1964 budget of the National Science Foundation. Apparently at his urging. an item was included calling for $122 million to support the growth of science in new centers. A House appropriations subcommittee headed by Representative Albert Thomas of Houston axed this item and held the N.S.F. budget to its 1963 figure. Participation by the Science Adviser in this matter thus seems of limited significance. Thus far the Science Adviser has not had much influence on the budget of the other major granting agency

— the National Institutes of Health. However, he has indicated an intention to operate in that sphere. A recent story by Robert C. Toth appearing in the *Washington Post* outlines what is in store. The substance of the article has been confirmed informally by a staff member of OST. The article says in part that:

> "Dean E. Wooldridge of Los Angeles, a noted aerospace official, has agreed to head a White House study of the National Institutes of Health. His appointment will be announced soon. . . . Attempts will be made to choose panel members from scientists who have no NIH grants. It will be difficult to find good medical researchers who do not have that potential conflict-of-interest problem. The result may be that most of the panelists will not be experts in medical research."

It is to be hoped that in this study the new panel will act with wisdom and restraint for the N.I.H. over the years has pursued the most enlightened policies of any of the granting agencies and should not be trifled with.

To summarize what I have said and to indicate what I think should be done about it, I would like to quote an editorial which will appear in the November 22 issue of *Science*.

> "Announcement of the retirement of Jerome B. Wiesner as the President's Science Adviser is an event which calls for stock-taking. Wiesner has served simultaneously in many roles — President's Science Adviser, chairman of the President's Science Advisory Committee, director of the Office of Science and Technology, and chairman of the Federal Council on Science and Technology. In addition he has been de facto director of the Bureau of the Budget for research and development and personnel procurement officer for scientific posts. He has had at his disposal perhaps more power than that enjoyed collectively by all other scientists connected with government. The principal sources of this authority have been access to the President, and control in budgetary matters.
>
> "In his many roles Wiesner has been required to present at least three differing visages to the world. As the President's adviser, his appropriate function has been that of self-effacing, impartial

judge, often acting under tightest security. As director of OST, it has been in the public interest for him to wield authority as openly as possible. His power also implicitly has required him to be a Statesman of Science — a deep thinker — with long-term views of evolving patterns in science and technology and of the relations among society, science, and education.

"The realities of politics and power dictate that the role of President's Science Adviser and its needs should transcend all other functions. Almost inevitably the secrecy necessary to that office has been carried over into the Office of Science and Technology, which attempts to keep secret even the identity of its employees and consultants. The realities of human behavior also dictate that immediate operating decisions take priority over long-term thinking.

"Wiesner has served the nation during a very difficult period. He has been among the most conscientious, hard-working individuals who have held high position in Washington. By tradition, comment at this time should consist of fulsome praise of his policies and accomplishments. Yet such comment would necessarily be an exercise in creative prose. After almost three years in which Wiesner has participated in countless decisions, there is little in the public domain to indicate the quality of his judgments or actions. For instance, the last annual report of the Federal Council for Science and Technology conveys the information that various studies are in progress.

"When power is exercised, someone gets pushed around, and other executive agencies have been the resentful victims. In addition, the fate of the OST budget indicates misgivings in the minds of members of Congress. Thus, the PSAC-OST complex faces potential hostility on the part of Congress and government agencies, and it has provided almost no intellectual basis for support by the scientific community. To repair the situation will probably require more than changing the guard. It will certainly necessitate a less arrogant mode of operation. Means should be found to separate functions of the PSAC-OST complex into logical packages, with no one man asked to perform more than is humanly possible. The job of President's Science Adviser is a big one which merits full-time effort. A full-time director should lead OST, and he should have a far better staff. Finally, we need a Planning Office headed by a man who can think and who can marshal the wisdom of this nation in attempting to give guidance for the future."